

CLAIMS

What is claimed is:

1. A steering device for a toy, comprising:
right and left turning members, each receiving a wheel;
a connecting member to connect the right and left turning members with each other;
a coil and a magnetic body to move the connecting member between first and second positions by carrying a current to the coil,
wherein one of the coil and the magnetic body is provided on the connecting member, the other of the coil and the magnetic body is fixed on the toy, and the connecting member is moved when the coil and the magnetic body come close to and go away from each other, and
wherein the right and left turning members are turned by moving the connecting member so as to change a direction of the wheels.
2. The steering device for a toy as claimed in claim 1, wherein the magnetic body is a permanent magnet and is provided on the connecting member, and the coil is fixed on the toy.
3. The steering device for a toy as claimed in claim 2, wherein the permanent magnet is provided so as to direct two poles of the permanent magnet to right and left directions, and the coil is provided so as to face an edge portion of the coil to one of the two poles of the permanent magnet.
4. The steering device for a toy as claimed in claim 1, wherein the connecting member comprises a spring for urging the connecting member into a neutral position between the first and second positions, when the current is not carried to the coil.
5. The steering device as claimed in claim 1, further comprising:
a trim to hold the connecting member in a neutral position between the first and second positions by adjusting a position of the torsion spring,
wherein the trim includes an eccentric cam to receive an end of the torsion spring, and a lever to adjust the position of the eccentric cam.
6. A steering device for a toy, comprising:
right and left turning members to turn respective wheels;

a connecting member to connect the right and left turning members with each other;
 an electromagnetic force applying member to apply an electromagnetic force to move the connecting member between a first position and a second position to turn the wheels;
 a current carrying control unit to control an operation of the electromagnetic force applying member; and
 a torsion spring for urging the connecting member into a neutral position between the first and second positions, when the current carrying control unit does not control the operation of the electromagnetic force applying member; and
 a trim for adjusting the neutral position of the connecting member by adjusting a position of the torsion spring,
 wherein the trim comprises an eccentric cam abutting the spring, and a lever connected to the cam for rotating the cam.

7. The running toy as claimed in claim 6, further comprising a suspension having a biasing member which contacts the right and left turning members;

wherein the turning members are biased in a first direction by the right and left edge portions.

8. The running toy as claimed in claim 6, further comprising: a suspension comprising two wheel shafts extending respectively from the turning members, the suspension including a biasing member having right and left edge portions elastically deformable in upper and lower directions;

wherein the wheel shafts are movable in the upper and lower directions in a predetermined range, and the wheel shafts are pressed with the right and left edge portions by a biasing force of the biasing member so that the wheels are in contact with a ground.

9. A running toy, comprising:
 a steering device for a toy, comprising:
 first and second turning members to turn respective steering wheels;
 a connecting member to connect the turning members with each other;
 a coil and a magnetic body to move the connecting member between first and second positions by carrying a current to the coil; and
 a torsion spring to keep the connecting member at a neutral position between the first and second positions, when the current is not carried in the coil,

wherein the turning members are turned by moving the connecting member between the first and second positions to change a direction of the steering wheels,

wherein one of the coil and the magnetic body is provided on the connecting member, and the other of the coil and the magnetic body is fixed to the toy,

wherein the connecting member is moved when the coil and the magnetic body come close to and go away from each other by controlling a current to be carried to the coil with a coil current carrying control unit, and

a device for adjusting a position of the spring into the neutral position.

10. The running toy as claimed in claim 9,

wherein the device for adjusting the position of the spring includes an eccentric cam to receive a first end of the torsion spring, and a lever to adjust the position of the eccentric cam.

11. A running toy, comprising:

a steering device including

first and second turning members;

a connecting member to connect the turning members with each other;

an electromagnetic force applying member to apply an electromagnetic force to move the connecting member;

a current carrying control unit to control a current carried to the electromagnetic force applying member, so that the connecting member is movable between two steering positions;

a torsion spring for urging the connecting member into a neutral position between the two steering positions, when the current is not carried to the electromagnetic force applying member;

a suspension device to bias the turning members; and

a device for adjusting a position of the spring.

12. A steering device for a toy, comprising:

right and left turning members to turn right and left steering wheels rotatably mounted thereon;

a connecting member to connect the right and left turning members,

an air core coil and a magnetic body, one of the air core coil and the magnetic body being located on the connecting member and the other being fixed on the toy, to use coil current to move the connecting member between at least two steering positions as the coil and

magnetic body move towards/away from each other; and

a torsion spring for urging the connecting member into a neutral position between the at least two steering positions, when no coil current is applied.

13. A steering device for a toy, comprising:
right and left turning members to turn right and left steering wheels respectively;
a tie rod to connect the right and left turning members together;
a coil to, upon receiving current, apply an electromagnetic force to move the tie rod in right and left directions, to turn the right and left steering wheels;
a magnetic body to attract/repel the coil;
a control unit to control current to the coil to cause the tie rod to move; and
a torsion spring for urging the tie rod into a neutral position, when the coil current is halted.

14. A running toy comprising:
a steering device for the toy, including
right and left turning units to turn right and left steering wheels, respectively;
a tying member, to tie and move the right and left turning units into at least two steering positions;
an air core coil stationary on the toy and a magnetic body movable with the tying member, which coil and body move the tying member in right and left directions when a current is applied to the air core coil, thereby moving the air core coil toward/away from the magnetic body; and
a torsion spring for urging the tying member into a neutral position between the at least two steering positions, when the current is halted.

15. A running toy, comprising:
a steering device including
right and left turning units to turn right and left steering wheels, respectively;
a member to connect and move the right and left turning units into at least two steering positions;
a coil on the member to apply an electromagnetic force to move the member in left and right directions to turn the right and left steering wheels;
a pair of spaced permanent magnets fixed on the toy to attract/repel the coil

therebetween due to the electromagnetic force;

a control unit to control a current to the coil;

a spring for urging the member into a neutral position between the at least two steering positions when the current is halted; and

a suspension device to urge the right and left turning units, which are movable in first and second opposite directions in a predetermined range, in a direction perpendicular to the right and left directions.

16. A running toy, comprising:

a steering device including

right and left turning units to turn right and left steering wheels, respectively;

a member to connect and move the right and left turning units into at least two steering positions;

a pair of spaced coils fixed to the toy to apply an electromagnetic force to move the member in right and left directions to turn the right and left steering wheels;

a permanent magnetic on the member, between the pair of coils, to attract/repel the coils due to the electromagnetic force;

a control unit to control a current to the coils;

a spring for urging the member into a neutral position between the at least two steering positions when the current is halted; and

a suspension device to urge the right and left turning units, which are movable in first and second opposite directions in a predetermined range, in a direction perpendicular to the right and left directions.

17. The steering device for a toy as claimed in claim 4, further comprising a turnable device for adjusting the position of the spring.

18. The steering device for a toy as claimed in claim 12, further comprising a turnable device for adjusting the position of the spring.

19. The steering device for a toy as claimed in claim 13, further comprising a turnable device for adjusting the position of the spring.

20. The steering device for a toy as claimed in claim 14, further comprising a turnable

device for adjusting the position of the spring.

21. The running toy as claimed in claim 15, further comprising a turnable device for adjusting the position of the spring.

21. The running toy as claimed in claim 16, further comprising a turnable device for adjusting the position of the spring.